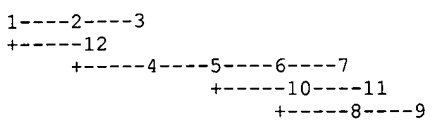
-------claim tree-----------



-------112--------------

claim# 11 contains the word -> substantially
claim# 11 contains the word -> substantial

--------best-----------
5204026
6348107
6159915
5007969
5676764
5629277
4508634
5098594
4764222
5332526
4780235
4560410
5665690
5929005
4714670
5827807
5294263
4594111
5449474
6395103
6057276
5108643
4414128
4511488
4968447
4533487
6019827
5032265
5098591
5693516
5549840
5064557
5075026
5035826
5076954
6030935
5082584
5490948
6491980
5888250
6261541
6475632
4640719
3382181
6475556
6360511
2935479
5167242
4953572
5236614

-------classlist-----------

134/38
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510/365

252/364
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106/311
510/175
134/26
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424/401
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510/170
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510/461
510/362
510/462
510/431
510/425
510/207
510/473
510/436
510/238
510/437
510/501
510/421
510/430
510/139
510/414
510/213
134/28
510/159
510/206
510/493
510/507
134/4
510/397
510/101
134/29
510/401

--------keywords----------

diluted with water water aluminum substrate aluminum free of alkali metal hydroxides aromatic free free o
f aromatics naturally occuring esters alkylene carbonate tar grease adhesive dried latex paint latext pai
nt organic esters propyl heptanoate heptyl propionate hexyl acetate heptyl acetate octyl acetate nonyl ac
etate decyl acetate propylene carbonate primary flash organic solvent terpene aqueous emulsion emulsion l
iquid carrier carrier chewing gum propylene carbonate carbonate propylene decyl nonyl octyl hexyl acetate
 hexyl propionate heptyl contaminant removing organic organic removing heptanoate latext paint ink chewin
g taw greases glues sap latex wt% esters propyl irritation acetate gum glycol dried solvent aqueous liqui
d irritant mir score
--------references----------

---------- 5204026
classes:1 510/405 1 134/31 1 134/38 1 134/40 1 510/188 1 510/365 1 510/407 1 510/413 1 510/421 1 510/499
1 510/500 1 510/505
score: 546

keywords: diluted with water;water;grease;propylene carbonate;primary;propylene carbonate;carbonate;propy
lene;organic;removing;greases;esters;acetate;glycol;solvent;aqueous;liquid;

- n
about 40 to 95 parts by volume ethylene dipropionate with the remainder
propylene **carbonate. The ratio of dipropionate and **carbonate**, within the
range, will be varied primarily upon consideration of the particular

cleaning task. If the material to be removed is more soluble in ethylene dipropionate that ethylene **carbonate**, then, the concentration of the dipropionate should predominate to the extent allowed within the range. The converse is similarly true. A preferred mixture includes between about 50 to about 60 parts by volume ethylene dipropionate with the remainder **propylene **carbonate**.

The dipropionate solvent can also include other additives that are used to address specific cleaning problems. The selection of the particular additives and the amounts used should generally be consistent with the objective for the solvent. For example, relatively high MW, saturated alcohols (such as decanol), sulfonated amines, or

- presents.

When corrosion is not a significant factor to guard against, the solvent can be **diluted with water** (as much as nine volumes of water to that of **organic solvent**; i.e., a final mix of 90% water) and still be an effective cleaner. In this diluted condition, the preferred aqueous solvents contain:

water;
the alicyclic **carbonate**;
ethylene dipropionate; and
optionally, any or all of TEA,
NMP, or
a nonionic wetting
agent

For example, such a solvent can comprise about:
40 vol % **propylene **carbonate**;
40 vol % ethylene dipropionate;
10 vol % nonionic wetting agent;
5 vol % TEA; and
5 vol % NMP,

and can be diluted with between about 3-9 volumes of water to leave a mixture that is about 75-9% vol % water.

In all these solvents, **propylene **carbonate** can be replaced with 50:50 mixture of ethylene **carbonate** and **propylene **carbonate** or be entirely replaced with ethylene **carbonate**.

Mixtures of ethylene **carbonate** and the dipropionate usually are made up by

---------- 6348107
classes:1 134/38 1 134/4 1 134/26 1 134/28 1 134/29 1 510/201 1 510/202 1 510/206 1 510/207
score: 519

keywords: water;primary;organic solvent;emulsion;organic;removing;paint;solvent;aqueous;liquid;

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United States Patent: 6,348,107
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FULL TEXT FORMAT-->

(1of1)
United States Patent
6,348,107
Whitton
,   et al.
February 19, 2002
Compositions and method for **removing paint** from a substrate

Abstract

A **paint** stripper for use by immersion of a **paint**ed substrate in a bath of the composition or application in place has two phases, one aqueous and the other of partially water soluble **organic solvent**. The aqueous phase is saturated with **organic solvent**. The **organic solvent** is preferably benzyl alcohol, dibasic ester or ethyl-e-ethoxypropionate, The total amount of **organic solvent** in the bath is suitably in the range 2 to 20%. The stripper may be acid or alkali activated. The application stripper is thickened to avoid separation during storage.

Inventors:

Whitton; Colin Alfred(Bucks, GB);

Braley; Joanna May(Middlesex, GB);
Lawlor; Angela Mary(Oxfordshire, GB)

Assignee:

Chemetall
- laimed is:
1. A method of stripping **paint** from a substrate surface comprising the steps of:
(i) providing a two-phase **liquid** stripper composition comprising;
(a) an aqueous phase which comprises water, dissolved water-soluble activator compound and an **organic solvent** comprising benzyl alcohol, said aqueous phase having a saturation concentration for **organic solvent**, the **organic solvent** being present in the aqueous phase at a concentration of about said saturation concentration;
(b) an **organic** phase comprising the said **organic solvent**, which **organic** phase is in interfacial contact with the aqueous phase;
(ii) contacting the substrate surface with said aqueous phase; and
(iii) stripping said **paint** from the substrate surface.
2. A method according to claim 1 in which the **organic solvent** has a solubility in water at 20.degree. C. in a range of 0.5 to 6.0% by weight.
3. A method according to claim 1 in which the composition is at a temperature greater

---------- 6159915
classes:1 510/201 1 134/38 1 510/174 1 510/202 1 510/407 1 510/493
score: 511

keywords: water;alkylene carbonate;propylene carbonate;primary;propylene carbonate;carbonate;propylene;organic;removing;paint;latex;esters;propyl;acetate;gum;glycol;

-
United States Patent: 6,159,915
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FULL TEXT FORMAT-->

(1of1)
United States Patent
6,159,915
Machac, Jr.
,   et al.
December 12, 2000
Paint and coating remover
Abstract
A composition useful as a **paint** remover. The composition may include a **carbonate**, a dibasic ester and a mono-ester. The composition may also contain an **organic** sulfur-containing compound such as dimethyl sulfoxide (DMSO), a glycol ether, a ketone, or combination thereof. The composition may be used in a process for **removing paint** by applying it to a **paint**ed surface. The compositions have several important attributes, including low toxicity and high efficacy in **removing paint** and coatings.

Inventors:

Machac, Jr.; James R.(Austin, TX);
Marquis; Edward T.(Austin, TX);
Woodrum; Susan A.(Austin, TX);
Darragas; Katty(Oudenaarde, BE)

Assignee:

Huntsman Petrochemical Corporation(Austin, TX)

Appl. No.:
335597
Fi
- Aug., 1997WO.
primary Examiner:Gupta; Yogendra
Assistant Examiner:Mruk; Brian P.
Attorney, Agent or Firm:O'Keefe, Egan & Peterman, LLP

Claims
What is claimed is:
1. A composition useful as a **paint** remover, consisting of: a **carbonate**, a dibasic ester and a ethyl-3-ethoxy-propionate, and optionally a ketone, optionally a glycol ether, optionally an alcohol, optionally an **organic** sulfur-containing compound, and also optionally containing a thickener.
2. The composition of claim 1, wherein the **carbonate** is an alkylene **carbonate** containing from 2 to 10 carbon atoms.
3. The composition of claim 1, wherein the **carbonate** is **propylene **carbonate** or ethylene **carbonate** or both.
4. The composition of claim 1, wherein the **carbonate** is ethylene **carbonate** or **propylene **carbonate**.
5. The composition of claim 1, wherein the glycol ether is present and has up to 20 carbon atoms.
6. The composition of claim 1, wherein the ketone is present and has up to

---------- 5007969
classes:1 510/118 1 134/31 1 134/38 1 134/40 1 252/364 1 430/329 1 430/331 1 510/176 1 510/201 1 510/202 1 510/407 1 510/505 1 510/506
score: 500

keywords: water;aluminum;alkylene carbonate;propylene carbonate;primary;organic solvent;propylene carbonate;carbonate;propylene;propionate;organic;removing;ink;greases;esters;acetate;glycol;solvent;liquid;

- Search:

252/170,171,364,DIG. 8
134/38,40,42,31
430/329,331

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4645617Feb., 1987Vivian252/165.
4680133Jul., 1987Ward252/153.
4781916Nov., 1988Papaphilippou252/162.
4801331Jan., 1989Murase252/364.
4822723Apr., 1989Dhillon430/331.
primary Examiner:Albrecht; Dennis
Attorney, Agent or Firm:Christensen, O'Connor, Johnson & Kindness
Claims
I claim:
1. A low toxicity solvent comprising 40-95 vol % ethylene diacetate and the remainder an alicyclic **carbonate** including an effective amount of ethylene **carbonate**, the solvent being aprotic and having a vapor pressure less than or equal to 1 mm Hg at 20.degree. C
- .
2. The solvent of claim 1 wherein the alicyclic **carbonate** compound is a mixture of ethylene **carbonate** and **propylene **carbonate**.
3. The solvent of claim 1 wherein the alicyclic **carbonate** is only ethylene **carbonate**.
4. The solvent of claim 1 comprising 45-75% ethylene diacetate.
5. The solvent of claim 1 comprising 45-55 vol. % ethylene diacetate.
6. A method of **removing** a residue from a solid substrate comprising the step of contacting the residue with an effective amount of the solvent of claim 1.
7. A method for **removing** photoresist from a substrate comprising the step of contacting the photoresist with an effective amount of the solvent of claim 1.
8. A method for **removing** fingernail enamel from a substrate comprising the step of contacting the enamel with an effective amount of the solvent of claim 1.
Description
BACKGROUND OF THE INVENTION

The present invention relates to **liquid organic solvent**s.
Organic solvents are useful as cleaners in
- ally translates into
increased operating costs.

A **primary** consideration to the user of an **organic solvent** is the toxicity of the components making up the solvent mixture. Although personal safety can be promoted primarily by preventing direct contact and exposure to such solvents by not exceeding published threshold values, such generalized policies do not take into consideration individual sensitivities or the possibility of an accidental exposure to amounts in excess of the threshold values. The flammability, volatility, cleaning ability, stability during storage, and odor are other factors that are considered by the user in choosing a particular solvent. One solvent that has found widespread application in industrial applications, such as the aerospace industry, is methylethylketone (MEK). Although MEK is generally considered a satisfactory solvent from a cleaning effectiveness standpoint, there is a growing concern th

- ils,
and reduce its aggressiveness for acrylics. The solvent effectively removes residues such as oils, **grease**s, epoxy resins, **organic adhesive**s, waxes, photoresist, inks, or fingernail enamel from solid substrates.

The present invention provides a low toxicity solvent that effectively dissolves many residues. The preferred solvent is essentially nonflammable and has a vapor pressure that is well below the ranges established by various governmental agencies as being acceptable to insure personal safety and reduce long-term health risks due to excessive exposure. The nonhazardous nature of the solvent reduces the degree of user apprehension normally associated with the use of solvents that expose the user to questionable hazards and toxicological risks. The solvent is virtually odor free and is stable under storage conditions. Further, the increasing costs normally associated with the disposal of toxic hazardous substances

- iquid mixture of an alicyclic **carbonate**
and a polar compound selected from the group consisting of alkyl diethers, alkyl diesters, and alkyl compounds containing both ester and ether groups, is formed. For example, it has been found that a preferred mixture of ethylene diacetate and ethylene **carbonate** provides a **liquid** solvent with superior cleaning properties. Generally, the mixtures exhibit a solidifying temperature that is below the normal solidification temperature of its **alkylene **carbonate** component; for instance, a depression of the solidification point of ethylene **carbonate** below about 36.4.degree. C. Preferably, the resulting mixture is a **liquid** at or near ambient temperatures.

The polar compounds which are useful in the present invention are generally of the type that include at least one electronegative oxygen capable of dissolving the alicyclic **carbonate** and residues to be cleaned. With regard to the alicyclic

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---------- 5676764
classes:1 134/38 1 134/40 1 134/42 1 252/364 1 510/188 1 510/201 1 510/202 1 510/245
score: 488

keywords: water;aluminum;primary;organic;removing;paint;propyl;acetate;solvent;

- mercury at 20.degree. C.

Another object is to provide a wiping solvent having the above characteristics and effective for cleaning **organic** coatings from substrate surfaces, and particularly effective for cleaning coatings and **adhesive**s application equipment, e.g. **paint** guns employed in the aircraft industry.

A still further object is the provision of a method for cleaning substrate surfaces, particularly **paint**ed surfaces, employing the improved wiping solvent of low vapor pressure noted above.

SUMMARY OF THE INVENTION

The above objects are achieved according to the invention by the provision of a solvent which consists essentially of methyl ethyl ketone, methyl isobutyl ketone, a propyl alcohol, toluene and a butyl acetate, in the proportions set forth in further detail hereinafter. Water is also included to aid in reducing the vapor pressure of the solvent. In order to meet more stringent vapor pressure requirements, the amount of

- lected completely; that is, it is assigned a value of zero. This would allow the composite vapor pressure of the invention solution to become more rapidly diminished as the composition is changed to a greater

proportion of water, but the proportion of water should be such that the resulting solution still retains the desired solvent properties.

The solvent of the present invention has been successfully used as a wiping solvent particularly to clean contamination and coatings from substrate surfaces such as metals, e.g. **aluminum**, stainless steel, and the like, prior to application of **organic** coatings, **adhesive**s or sealants, and prior to welding. The invention solvent can also be used to clean metal surfaces prior to **paint**ing, to clean primed or **paint**ed surfaces without **removing** the coating, and to clean **aluminum** parts prior to anodizing. The invention solvent is particularly effective for cleaning fresh **paint** from metal substra

- te surfaces, and especially for cleaning coatings and **adhesive**s application equipment, e.g. **paint** guns, as utilized in the aircraft industry.

DETAILED DESCRIPTION OF THE INVENTION AND PREFERRED EMBODIMENTS

As noted above, the essential components of the solvent of the present invention are methyl ethyl ketone, methyl isobutyl ketone, a propyl alcohol, a butyl acetate and toluene, and with some water also present. The propyl alcohol can be either n-propyl alcohol or isopropyl alcohol, the latter being preferred. Also, the butyl acetate can be either n-butyl acetate or isobutyl acetate, the former being preferred.

The components of the solvent are employed in the following ranges of proportions in volume percent.

TABLE I

Ranges of Proportions of Components (% by Vol.)

about 35 to about 41% methyl ethyl ketone,
about 20 to about 25% methyl isobutyl ketone,
about 5 to about 20% of a propyl alcohol,
about 5 to about 20% toluene,
about 5 to about 20% o

---------- 5629277

classes:1 510/202 1 134/38 1 510/118 1 510/174 1 510/201

score: 466

keywords: water;alkylene carbonate;propylene carbonate;primary;flash;propylene carbonate;carbonate;propylene;organic;removing;paint;propyl;acetate;glycol;dried;aqueous;liquid;irritant;

- under reasonable conditions of use and storage.

In carrying out these and other objects of the invention, there is provided, in one form, a composition for **removing paint** comprising an **alkylene **carbonate** selected from the group consisting of **propylene** **carbonate**, butylene **carbonate** and mixtures thereof, **propylene** glycol as a hydrotrope and a polypropylene glycol having a molecular weight of at least 200. Optionally, a hydroxyalkylcellulose may be used as a thickening agent. For example, hydroxymethylcellulose may be used in an amount of at least 0.1 volume percent.

DETAILED DESCRIPTION OF THE INVENTION

The invention concerns a graffiti and **paint removing** composition that has only three required components.

The **alkylene **carbonate** is the **primary** active agent that removes the **paint**, and it is selected from the group of **propylene **carbonate**, butylene **carbonate** and mixtures thereof. In one embodiment, **alkylene **carbonate** is present in a

- ol (PPG). PPG is used to modify viscosity. By polypropylene glycol is meant **propylene** glycol that has been oligomerized or polymerized, so that it has an average molecular weight of at least 200; preferably between about 400 and about 4,000. For example, PPG-2000, a 2000 average molecular weight polypropylene glycol available from Huntsman Corporation is a suitable component. For the purposes of this description, molecular weight is defined as number average molecular weight. The proportion of PPG used, based on the total **paint** remover composition, may range from about 2 to about 30 volume percent; preferably from about 5 to about 15 volume percent.

A third required component is a hydrotrope used to keep the other two components together in the mixture. A hydrotrope is understood to be a chemical which has the property of increasing the aqueous solubility of slightly soluble **organic** chemicals. A hydrotrope's ratio of charge to

- uent ones the hydrotropes were investigated for their solubilizing power in aqueous solutions.

A change in the perception of their mechanism of action came in the sixties when Lawrence pointed out that short chain surfactants would delay

the gelling to a **liquid** crystalline phase which takes place at high surfactant concentrations. Friberg and Rydhag showed that hydrotropes, in addition, prevent the formation of lamellar **liquid** crystals in combinations of surfactants with hydrotropic amphiphiles, such as long chain carboxylic acids and alcohols. . . .

The hydrotropes in this era were short chain sulfonates, with the p-xylene sodium sulfonate as a typical example. Their action is [sic] preventing the formation of **liquid** crystals is easily understood from a direct comparison of their molecular geometry. . . .

The short bulky aromatic compound does not pack well in a lamellar **liquid** crystalline structure, the mutual stabilizing action

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---------- 4508634
classes:1 510/139 1 134/38 1 510/159 1 510/397 1 510/462 1 510/505
score: 463

keywords: water;grease;adhesive;propylene carbonate;primary;emulsion;propylene carbonate;carbonate;propylene;organic;removing;paint;esters;propyl;glycol;dried;solvent;aqueous;liquid;

- of the **propylene**
carbonate in the compositions of the invention.

The following table sets forth the concentration ranges of the various ingredients of compositions suitable for the practice of this invention:

TABLE I

Ingredient	Concentration Range (parts by weight)
Water	10-50
propylene **carbonate	10-40
Cosolvents	1-30
Surfactants	0.5-12
Thickening agents	0.1-5
Neutralizing agents	0.01-1.0
Preservatives	0-0.5
Moisturizers/emollients	0-25
Abrasive materials	0-15

The skin cleaning composition is effective for **removing** refinish automotive **paint**s and primers, as well as **grease** and dirt. The composition has excellent chemical

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---------- 5098594
classes:1 134/1 1 134/34 1 252/364 1 510/118 1 510/176 1 510/365 1 510/405 1 510/407 1 510/413 1 510/421 1 510/499 1 510/505
score: 457

keywords: diluted with water;water;aluminum;alkylene carbonate;grease;propylene carbonate;primary;carrier;propylene carbonate;carbonate;propylene;organic;removing;paint;ink;greases;esters;acetate;glycol;solvent;aqueous;liquid;

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COSMOLINE is a trademarked corrosion inhibitor of E. F. Haughton

EXAMPLE 2

Plastic panels made from the resins listed in TABLE 2 were immersed in the listed solvents for a period of 168 hours (one week) to test the effect of the solvents on the plastic. The results were visually observed and recorded according to the following key:

++=major effect
+=some effect
-=no effect

The solvents tested were:
1. MOK (an in Example 1)
2. **propylene **carbonate**

3. Ethylene diacetate
4. 2-Ethylhexyl acetate
5. 1,2-propylene glycol
6. Ethyl-3-ethoxypropionate
7. Triacetin
8. Terpineol

MOK did not adversely affect any plastic substrate tested. While MOK does attack solvent-sensitive plastics (principally through its diacetate component), it is usable on nearly all high performance composites, thereby making it usable in aerospace applications. MEK is known to attack engineering

-	**propylene** **carbonate**	-	+	-	-	-	-	-
	3. Ethylene Diacetate	-	+	-	-	-	-	-
	4. 2-Ethylhexyl Acetate	-	+	-	-	-	-	-
	5. 1,2-Propylene Glycol	-	-	-	-	-	-	-
	6. Ethyl-3-Ethoxy-**propionate**	-	++	-	+	-	-	-
	7. Triacetin	-	-	-	-	-	-	-
	8. Terpineol	-	-	-	-	-	-	-

EXAMPLE 3

MOK was tested for its effectiveness in **removing** Kodak KPR3.TM. and DuPont RISTON.TM. photoresist and Kodak Thin Film Resist (KTFR.TM.) from electronic circuitry equipment by contacting the photoresist and etch resist with the solvent. The solvent mixture removed KPR3.TM. and RISTON.TM. photoresist effectively upon 30 minutes of soaking without scrubbing. The removal was accelerated by h

---------- 4764222

classes:1 134/38 1 134/2 1 134/3 1 134/26 1 134/41 1 510/202 1 510/206 1 510/212 1 510/470

score: 454

keywords: water;adhesive;primary;removing;paint;gum;dried;solvent;

- , "Encyclopedia of Chemical Technology", vol. 12, (1980), pp. 45-65.

primary Examiner:Pal; Asok
Attorney, Agent or Firm:Lopez; Gabriel, Pfeiffer; Hesna J.

Claims

What is claimed is:

1. A process for **removing** dried **paint** from a surface which comprises applying to said surface an effective amount of a composition comprising by weight 0.25-2% rhamsan gum, 40-90% N-methyl-2-pyrrolidone, 0.5 to 2% ethoxylated non-ionic surfactant, and water to 100%, allowing said dried **paint** to soften, and then **removing** said softened **paint** from said surface.

Description

BACKGROUND OF THE INVENTION

N-methyl-2-pyrrolidone (NMP) is a commercially available (e.g., from BASF Wyandotte or GAF) solvent used industrially for cleaning, production of electronic circuiting, etc. A recent application of this solvent is as a **paint** stripper, i.e. a remover of dried coats of **paint** from surfaces. Although methylene chloride is widely used for this purpose, its hig

- h

volatility and suspected carcinogenicity has led to a search for an alternative product.

A disadvantage of NMP is its low viscosity and low **adhesive** properites. This is particularly problematical when the NMP is applied to a vertical surface since it will flow off the surface before penetration, especially if the surface has multiple coats of dried **paint**.

SUMMARY OF THE INVENTION

It has now been found that rhamsan gum is soluble in NMP/water systems containing up to 90% NMP.

DETAILED DESCRIPTION

The compositions of this invention comprise 0.25-2% S-194, 40-85% NMP, and water to 100%, all by weight. Optionally, these compositions can also comprise 0.5 to 2% ethoxylated non-ionic surfactant. Other additives commonly used in the preparation of **paint** strippers are also within the scope of these compositions. However, additives such as paraffin wax, which is used to retard solvent evaporation, activators such as amines, and catio

- d **paint**

from a **paint**ed surface which comprises applying to such surface a composition of this invention (i.e., compositions containing 40-85% NMP or up to 90% NMP when 0.5 to 2% ethoxylated non-ionic surfactant is used), waiting for the **paint** to soften, and then **removing** the softened **paint** from the surface.

Commercially available surfactants within the scope of this invention include but are not limited to Triton X-100 (ethoxylated **octyl**phenol, Rhom and Haas), Plurunic F88 (polyoxyethylenepolyoxypropylene block polymer, BASF Wyandotte), and Tetronic 1107 (highmolecular weight polyether block polymer, BASF Wyandotte).

The compositions of this invention are prepared by dissolving the rhamsan gum in water followed by NMP addition, or by dispersal of the gum in NMP followed by addition of water and dissolution of the gum. When a surfactant is used, it is preferably added after the gum/NMP/water composition is prepared.

The us

---------- 5332526
classes:1 510/212 1 134/38 1 510/106 1 510/407 1 510/413
score: 449

keywords: water;primary;flash;propylene;removing;paint;glycol;liquid;

- son252/170.

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5124062Jun., 1992Stevens252/162.
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5188675Feb., 1993Dormon-Brailsford134/4.
Foreign Patent Documents
389829Oct., 1990EP.
2230791Oct., 1990GB.

primary Examiner:Skaling; Linda
Attorney, Agent or Firm:Davey; Merlin B.

Claims
I claim:

1. An environmentally acceptable composition for stripping **paint** and varnish consisting essentially of from 10 to 25 weight percent N-methyl-2-pyrrolidone, from 2 to 35 weight percent of a mixture of **propylene** glycol n-butyl ether and dipropylene glycol dimethyl ether, from 5 to 10 weight percent of ethyl 3-ethoxypropionate, from 5-15 weight percent of isopropyl alcohol, from 10-25 weight percent of a lower aliphatic ketone, from 1 to 5 weight percent

- oxy-1-propanol based on the total weight of the stripping composition.

4. Composition of claim 1 further including from 2-5 weight percent of a thickener.

5. Composition of claim 4 wherein the thickener is hydroxypropyl cellulose.

6. Composition of claim 1 wherein the surfactant comprises from 1-5 weight percent based on the weight of the total composition of **nonyl**phenoxypoly(ethyleneoxy)ethanol.

7. Method for stripping **paint** and varnish from surfaces coated with said **paint** or varnish which comprises applying the composition of claim 1 to said **paint**ed or varnished surface and thereafter **removing** the softened **paint** or varnish.

8. Method for stripping **paint** and varnish from surfaces coated with said **paint** or varnish which comprises applying the composition of claim 6 to said **paint**ed or varnished surface and thereafter **removing** the softened **paint** or varnish.

Description

BACKGROUND OF THE INVENTION
This invention relates to compositions a
- and varnish strippers, it has been found that they are not environmentally acceptable due to the suspected carcinogenic activity of toluene.

SUMMARY OF THE INVENTION
This invention provides an improved composition and method for stripping **paint** or varnish from a variety of substrates such as, for example, wood, metal, glass, fiberglass and plastics which comprises at least one member of the group consisting of N-methyl-2-pyrrolidone and dipropylene glycol dimethyl ether, ethyl 3-ethoxypropionate, lower alipathic ketones, surfactants and at least one member of the group consisting of lower alkyl ethers of **propylene** glycol and dipropylene glycol wherein the lower alkyl groups comprise 1 to 4 carbon atoms. Odorants, such as d-limonene and thickeners, may be added if desired. The compositions of this invention have improved stripping efficiency, improved **flash** points, reduced evaporation and improved environmental safety. They are

---------- 4780235
classes:1 510/212 1 510/201 1 510/407 1 510/414 1 510/473 1 510/500 1 510/505 1 510/506 1 510/507
score: 432

keywords: water;primary;flash;organic solvent;propylene;organic;removing;paint;latex;esters;propyl;acetat
e;glycol;solvent;liquid;

- 252/548.
4120810Oct., 1978Palmer252/153.
4477288Oct., 1984Kazmierczak et al.134/19.
4666626May., 1987Francisco252/153.
4673524Jun., 1987Dean252/118.
Foreign Patent Documents
3438399Mar., 1986DE.
primary Examiner:Lieberman; Paul
Assistant Examiner:Krasnow; Ronald A.
Claims
I claim:
1. A **paint removing** composition consisting essentially of (a) at least 20% by weight of at least one C.sub.1 to C.sub.4 dialkyl ester of a C.sub.4 to C.sub.6 aliphatic dibasic acid, (b) 0.1 to 5% by weight of an activator, selected from the group consisting of formic acid, acetic acid and oxalic acid or selected from the group consisting of ammonium hydroxide and monoethanolamine, (c) an effective amount of at least one thickener, (d) an effective amount of a compatible surfactant, and (e) from 1 to 80% by weight of at least one nonhalogen-containing-organic solvent.
2. The composition of claim 1 which consists of the listed components, and in which the
- of claim 1 in which the activator is ammonium hydroxide, and the nonhalogen-containing-organic solvent is N-methyl-2-pyrrolidone.
9. The composition of claim 1 in which the C.sub.1 to C.sub.4 dialkyl ester of a C.sub.4 to C.sub.6 aliphatic dibasic acid is present in the amount of at least 40% by weight, and the nonhalogen-containing **organic solvent** is present in the amount of between 1 and 60% by weight.
10. The composition of claim 1 in which the nonhalogen-containing-organic solvent is N-methyl-2-pyrrolidone, and the activator is acetic acid.
Description
FIELDS OF THE INVENTION
This invention relates to a composition of matter suitable for use as a **paint** remover. The composition is less hazardous to use than conventional **paint** remover.
BACKGROUND OF THE INVENTION
A common commercially available class of **paint** remover contains a high percentage of methylene chloride. Although methylene chloride based **paint** removers are inexpensive and qui

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classes:1 106/2 1 101/451
score: 419

keywords: water;primary;propylene;hexyl;organic;ink;acetate;gum;glycol;aqueous;

- OCOC(CH.sub.3).sub.2 CH.sub.2 OH, **hexyl**
Cellosolve, i.e., C.sub.6 H.sub.13 OCH.sub.2 CH.sub.2 OH, **hexyl** Carbitol, i.e., C.sub.6 H.sub.13 O(C.sub.2 H.sub.4 O).sub.2 H, and the like. The polyol and/or glycol ethers which is completely soluble in water includes, for example, **propylene** glycol, ethylene glycol, dipropylene glycol, diethylene glycol, **hexyl**ene glycol, triethylene glycol, tetraethylene glycol, tripropylene glycol, 1,5-pentanediol, methyl cellosolve, i.e., CH.sub.3 OC.sub.2 H.sub.4 OH, cellosolve solvent, i.e., C.sub.2 H.sub.5 OC.sub.2 H.sub.4 OH, butyl cellosolve solvent, i.e., C.sub.4 H.sub.9 OC.sub.2 H.sub.4 OH, and the like.

The solubility is measured by determining the percent by weight of the polyol and/or glycol ether which is soluble in water at 20.degree. C. A polyol and/or glycol is characterized as partially soluble in water if its solubility in water at 20.degree. C. is from about 0.99 to about 28.0 w

- s acetic acid, nitric acid, hydrochloric acid, and the like. A buffering agent, such as ammonium acetate can also be included.

The fountain solution is generally maintained at a pH of from about 2 to about 5. However, the particular pH at which a given solution will be maintained will depend upon factors, such as the type of water-soluble polymer used, other ingredients in the solution as well as the type of substrate employed in the lithographic printing plate, and the like.

Other additives which may be used in the fountain solution include preservatives such as phenol, sodium salicylate, and the like; corrosion inhibitors such as ammonium bichromate, magnesium nitrate, zinc nitrate, and the like; hardeners, such as chromium **aluminum**, and the like; **organic** solvents, such as cyclic ethers, e.g., 4-butyrolactone, and the like; low molecular weight aldehydes, such as formaldehyde, glutaraldehyde, and the like. These additives are gen

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classes:1 510/407 1 252/364 1 510/170 1 510/172 1 510/174 1 510/213 1 510/365 1 510/413 1 510/500 1 510/501 1 510/506

score: 416

keywords: aluminum;grease;propylene carbonate;primary;flash;organic solvent;terpene;propylene carbonate;carbonate;propylene;organic;paint;ink;glues;irritation;acetate;glycol;solvent;liquid;

- is greatly reduces the likelihood that the solubilized material will re-adhere to or re-deposit on the cleaned surface due to evaporative loss of the solvent.

The present invention thus provides a **liquid** solvent mixture which is low in toxicity, and presents an effective and environmentally beneficial alternative to conventional cleaning solvents like MEK and methylene chloride. The preferred mixture of **propylene **carbonate**, d-limonene, and tripropylene glycol methyl ether out-performs most conventional solvents, without harming the substrate, be it ceramic, glass, metal, or plastic. The field experience with the solvent mixture of the present invention demonstrated that this is not only a safe and economical solvent, especially from the standpoint of regulatory requirements, but that it is a surprisingly effective solvent for many industrial cleaning applications, and that its longevity in use increases its economic advan

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classes:1 510/174 1 134/38 1 510/200 1 510/201 1 510/202 1 510/212 1 510/240 1 510/241 1 510/366 1 510/499 1 510/507

score: 412

keywords: water;aluminum;primary;propylene;organic;removing;paint;ink;esters;glycol;solvent;

- nd without the side effect of destroying most of the surfaces on which it is applied.

SUMMARY OF THE INVENTION

According to the present invention, there are provided graffiti removers having hydrophobic characteristics, low chemical reactivity and low oil absorption, which comprise:

(a) from about 6.5 to about 30.0 wt. % of an active oxygenated **organic** halogen- and sulfur-free solvent selected from the group consisting of short chain aliphatic diacid esters, pyrrolidones, butyl carbitol,

di(lower)alkyl ether/esters or di(lower)alkyl ethers of di(lower)alkylidene glycols, or a mixture of any of the foregoing;

(b) from about 0.0 to about 30 wt. % of a secondary solvent selected from the group consisting of an **organic** sulfone, an **organic** sulfoxide, a high molecular weight alcohol, a **primary**, secondary or tertiary amine, or a mixture of any of the foregoing;

(c) from about 5.0 to about 50 wt % of an emollient selected from the group co

- nsisting of high molecular weight fatty acids, oleic acid, high molecular weight fatty acid amides, and a mixture of any of the foregoing; and

(d) from about 25.0 to about 50.0 wt. % of an amorphous particulate filler selected from the group consisting of **aluminum** silicates, kaolin clay, magnesium silicates, talc, barium sulfates, calcium **carbonate**s, silicas, mica, wollastonite, and mixtures of any of the foregoing.

Also contemplated by the present invention is a process comprising applying to a graffiti-marked surface a graffiti remover as defined above in an amount effective to allow subsequent removal of the graffiti from the surface.

DETAILED DESCRIPTION OF THE INVENTION

The graffiti removers of the present invention contain an active, **primary** solvent, optionally coupled with a secondary solvent that allows the **primary** solvent to be fully reactive in **removing** the unwanted stain from different substrates. Furthermore, these acti

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classes:1 430/331 1 430/154 1 430/302 1 430/309
score: 401

keywords: water;aluminum;propylene carbonate;primary;organic solvent;emulsion;propylene carbonate;carbona
te;propylene;organic;removing;gum;glycol;solvent;aqueous;

- optionally, pigments which adhere with the resinous material to the imaged areas of the printing plate.

The aqueous phase contains water having dispersed therein protective colloids, finely divided particles, typified by a finely divided talc, and surfactants to keep these materials in suspension in the **emulsion** and to prevent the emulsified oil phase from coalescing in the aqueous phase of the **emulsion**.

The previously noted **organic solvent** is used in the oil phase in an amount in excess of that needed to saturate the aqueous phase of the **emulsion**. As a result, sufficient solvent remains in the oil phase to maintain the resinous material in solution in the oil phase of the **emulsion**.

Emulsion developers are illustrated in U.S. Pat. Nos. 3,313,233 issued Apr. 11, 1967 and 3,669,664 issued June 13, 1972 which discuss the various resins which can be emulsified in the developer and the solvents which are used therewith. **emulsion** de

- lvent. It is found that these aliphatic cyclic **carbonate** solvents, which will be discussed more fully hereinafter, will effectively dissolve the resinous materials used and will provide a superior job of **removing** the dark reaction products which are sometimes present in the unexposed portions of the photosensitive coating being developed. The **carbonate** solvents used herein are non-toxic, non-flammable, non-volatile and have little odor, but at the same time they are sufficiently water soluble to allow them to be satisfactorily washed out of the developed printing plate so that the deposited resinous material will remain essentially tack-free.

Preferred **carbonate** solvents for use in this invention are glycerine **carbonate**, ethylene **carbonate** and **propylene **carbonate**. **propylene **carbonate** is particularly preferred because it is a good solvent for the normally solid resins used herein, it is partially water soluble so as to be easil

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---------- 5827807
classes:1 510/118 1 134/38 1 510/405 1 510/407 1 510/437
score: 393

keywords: water;propylene carbonate;primary;propylene carbonate;carbonate;propylene;removing;paint;esters
;acetate;glycol;aqueous;liquid;

- ate	14	13	23	20	--	--	--	30	65	25	17
propylene **carbonate	--	--	--	--	75	--	--	--	--	--	--
Ethanol	53	41	26	41	25	53	30	63	--	--	10
Glycerine	3	--	3	--	--	--	--	3	--	2	--
2-Ethylhexanoic acid triglyceride	--	5	--	5	--	3	4	3	--	--	--
1,3-Isostearyl-myristoyl diglyceride	3	--	3	--	--	3	--	--	3	3	3
Water	4	5	5	1	--	1	1	1	2	2	2

An aqueous enamel (aqueous polymer **emulsion**: 90%) was **paint**ed once or twice on nails, and a top coat was further **paint**ed thereon. After 24 hours, the enamel was removed with the enamel removers obtained above to evaluate the odor and the **removing** power thereof according to the following criteria:

Evaluation Methods

(1) Odor in the use

AA: Almost no odor

BB: Slight odor

CC: Stimulant o

5294263

classes:1 134/40 1 106/311 1 252/364 1 510/174 1 510/175 1 510/245 1 510/254 1 510/365 1 510/407 1 510/505

score: 374

keywords: primary;flash;propionate;organic;removing;ink;esters;propyl;solvent;

- opionate and higher homologues. Blends of these esters produces cleaning effectiveness and low toxicity.

The mixtures are particularly useful in electronic parts cleaning and defluxing, and for degreasing. The blending of the **propionate** solvents produces a selective range of evaporation rates and **flash** Points.

Inventors:

Riso; Anthony(Piermont, NY)

Assignee:

Rossi Technology Corporation(Orangeburg, NY)

Appl. No.:
933246
Filed:

August 21, 1992
Current U.S. Class:
134/40; 106/311; 252/364; 510/174; 510/175; 510/245; 510/254; 510/365; 510/407; 510/505
Intern'l Class:
C23G 005/00
Field of Search:

106/311
134/40,38,42
252/170,364

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3-41170Feb., 1991JP.

primary E

- sting of methyl hydroxy **propionate**, ethyl hydroxy **propionate**.

2. A method as in claim 1 wherein the solvent blend consists essentially of 20 to 80 parts by wight of butyl **propionate** and 20 to 80 parts by wight of ethyl hydroxypropionate.

3. A unique solvent blend to replace hazardous chemicals and solvents in commercial and industrial applications for degreasing, ink removal and paste cleaning for thick film processes in electrical and electronic operations and related industries, consisting of 20 to 80 parts by weight of butyl **propionate** and 20 to 80 parts by wight of ethyl hydroxypropionate.

Description

BACKGROUND OF THE INVENTION

This invention relates to the composition of non-hazardous and non-toxic solvent systems. The objective of this invention is to provide alternatives to those solvents or solvent compositions that are either labeled hazardous by OSHA (Occupational Safety and Health Act), or have an undesirable Tox

- nvironment and safe for the workers.

SUMMARY OF THE INVENTION

This invention is comprised of the chemical group of **organic esters**. More specifically, the esters herein described are the **propionate**s of n-butyl **propionate** and ethyl hydroxy **propionate**. The methyl, ethyl, proply or higher **propionate** or hydroxy **propionate**s may also be used. The solvent systems of this invention have application as industrial cleaning solvents. Of the broader range of usage, these solvent systems can be used as "Safe Solvent" degreasers in **removing** oils and waxes from metal parts and the like. It has further application as ink removers such as printing ink clean-up from print rollers, machinery and the like. In specialized areas, these solvent blends are particularly useful in electronic applications. More specifically, the invention was developed for the cleaning of screens and substrates in the thick film process. The thick film process utilizes t

- tion and be able to provide a "Non-Flammable" rating per DOT (Department of Transportation) standards of above 100 degrees Fahrenheit **flash** point.

DETAILS OF THE INVENTION

Example I

A blend of n-butyl **propionate** with ethyl hydroxy **propionate** was made of the following mixture:

Parts by weight
n-butyl **propionate** 20
ethyl hydroxy **propionate** 80

It was found that the addition of n-butyl **propionate** to the ethyl hydroxy **propionate** resulted in a synergistic mixture with enhanced cleaning power over the ethyl hydroxy **propionate** alone, while the more potent odor of the n-butyl **propionate** was greatly mitigated by the content of the milder ethyl hydroxy **propionate**. The admixture of Example I. has a **flash** Point above 100 degrees Fahrenheit and is Non-Flammable

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classes:1 134/3 1 134/6 1 134/28 1 134/38 1 134/41 1 510/174 1 510/202 1 510/206 1 510/213 1 510/240 1 510/244 1 510/245 1 510/254 1 510/342 1 510/437

score: 374

keywords: water;aluminum;propylene carbonate;primary;propylene carbonate;carbonate;propylene;removing;paint;ink;latex;gum;solvent;aqueous;liquid;

- dure has been used repeatedly and consistently to manufacture the **liquid** cleaner-solvent embodying the preferred embodiment of the invention set forth above.

Other useful embodiments of the invention have been found to include the coconut amide up to about ten percent (10%) by weight and as low as six percent (6%) by weight without adversely affecting the properties of the **liquid** cleaner solvent of the invention. The tall oil fatty acid has been as high as two percent (2%) by weight of the **liquid** cleaner solvent of the invention without adversely affecting the results obtained when using the

invention. Similarly, the isopropyl alcohol has been as high as ten percent (10%) by weight of the **liquid** cleaner solvent of the invention and the **propylene **carbonate** has been as high as thirty percent (30%) by weight of the **liquid** cleaner solvent of the invention.

It is believed that the invention may be successfully formulated where wate

- iti remover and is particularly adaptable to be used for cleaning truck, train and bus exteriors due to its selective removal characteristic whereby it is possible to remove a top layer of graffiti, **paint** or marking pen ink without affecting the base layer of preservative applied to the surface.

The **liquid** cleaner-solvent embodying the invention has been found to completely remove baked-on varnish deposits from engines and carburetors in minutes. As a rust remover the **liquid** cleaner-solvent embodying the invention emulsifies heavy rust deposits almost immediately and is equally effective at **removing grease**, gun blue and drawing compounds from metal. The **liquid** cleaner-solvent embodying the invention dissolves aluminim oxides and other oxide from **aluminum** and imparts a mirror-like finish to many metals.

The **liquid**-cleaner solvent embodying the invention removes self-adhesive glue, caulk, isocyanates, epoxies, hardened soap and

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classes:1 510/407 1 134/38 1 134/40 1 252/364 1 510/170 1 510/172 1 510/174 1 510/365 1 510/461 1 510/505

score: 372

keywords: aluminum;grease;propylene carbonate;primary;flash;organic solvent;terpene;propylene carbonate;carbonate;propylene;organic;paint;ink;glues;irritation;glycol;solvent;liquid;

- of the present invention relative to that of MEK.

The first field test was conducted using the "EP921" solvent given by Example I above. This testing was conducted in a large pulp and paper mill having 17 full-time **paint**ers engaged in on-site maintenance **paint**ing. Prior to adopting the EP921 solvent as a substitute for MEK in cleaning **paint**ing equipment, this facility routinely consumed twelve 55-gallon drums of MEK per month for this purpose. Since adopting the low-vapor pressure EP921 solvent as a replacement for the MEK, consumption (of the EP921) has fallen to between two and four drums per month. Inasmuch as this facility did not practice any reclamation or life-extending procedures with respect to the solvent during this test, this usage difference is most probably entirely attributable to the differences in cleaning power and evaporation rate between EP921 and the MEK which it has replaced.

Similarly, site testing

- hat the solubilized material will re-adhere to or re-deposit on the cleaned surface to evaporative losses of the solvent.

The present invention thus provides a **liquid** solvent mixture which is low in toxicity, and presents an effective and environmentally beneficial alternative to conventional cleaning solvents like MEK and methylene chloride. The preferred mixture of **propylene **carbonate**, d-limonene, and tripropylene glycol methyl ether out-performs most conventional solvents, without harming the substrate, be it ceramic, glass, metal, or plastic. The field experience with the solvent mixture of the present invention demonstrated that this is not only a safe and economical solvent, especially from the standpoint of regulatory requirements, but that it is a surprisingly effective solvent for many industrial cleaning applications, and that its longevity in use increases its economic advantages.

The solvent of the present inv

---------- 6395103

classes:1 134/40 1 134/1 1 134/2 1 134/3 1 134/26 1 134/38 1 510/206 1 510/212 1 510/365

score: 344

keywords: water;alkylene carbonate;grease;propylene carbonate;primary;propylene carbonate;carbonate;propylene;organic;removing;paint;greases;latex;esters;propyl;acetate;gum;glycol;solvent;

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United States Patent: 6,395,103
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FULL TEXT FORMAT-->

(1of1)
United States Patent
6,395,103
Machac, Jr.
,   et al.
May 28, 2002
Degreasing compositions
Abstract
A composition useful as a **paint** remover which may include a **carbonate**, a dibasic ester and a mono-ester. The **paint** stripping composition may also contain an **organic** sulfur-containing compound such as dimethyl sulfoxide (DMSO), a glycol ether, a ketone, or combination thereof. The composition may be used in a process for **removing paint** by applying it to a **paint**ed surface. A degreasing composition is also disclosed which may comprise a **carbonate** and a alkyl-substituted cyclo-alkane such as naphthene. The compositions have several important attributes, including low toxicity and high efficacy in **removing paint** and coatings.

Inventors:

Machac, Jr.; James R.(Lago Vista, TX);
Marquis; Edward T.(Austin, TX);
Woodrum; Susan A
- 9 filed May
23, 1997 and Ser. No. 60/048,450 filed Jun. 3, 1997.
Claims
What is claimed is:
1. A method useful for **removing grease** from a substrate, comprising:
applying a degreasing composition to a **grease** on a substrate in an amount and under conditions effective to remove at least a portion of the **grease** from the substrate, wherein the composition comprises a **carbonate** and an alkyl-substituted cyclo-alkane, and optionally a soy **carbonate**, wherein the **carbonate** is a **alkylene **carbonate**, a dialkyl **carbonate**, or combination thereof.
2. The method of claim 1, wherein the **carbonate** is an **alkylene **carbonate** containing from 2 to 10 carbon atoms.
3. The method of claim 1, wherein the **carbonate** is **propylene **carbonate** or ethylene **carbonate** or both.
4. The method of claim 1, wherein the **carbonate** is ethylene **carbonate** or **propylene **carbonate**.
5. The method of claim 1, wherein the composition further comprises a glycol ether.
6. The process

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classes:1 510/174 1 134/38 1 510/200 1 510/201 1 510/202 1 510/212 1 510/240 1 510/241 1 510/366 1 510/49 9 1 510/507
score: 340

keywords: water;aluminum;primary;organic;removing;paint;ink;esters;glycol;solvent;

- oil.
Still needed in the art are graffiti removers that will effectively remove stains of an **organic** nature, especially permanent inks and dyes from **paint**ed surfaces without harming the underlying surfaces, without using harsh chemicals as activators and/or dye bleaching agents, which operate slowly, allowing a more concentrated attack, but efficiently, even on vertical surfaces, and which are cleanable by rinsing with water.
The present invention is based on the discovery that if a suitable filler is used in combination with an active solvent and a secondary solvent, graffiti removers can be developed which are efficient to remove stains that are **organic** in nature from a variety of surfaces employing very mild solvents in compositions that are relatively environmentally friendly when compared to those which are now known in the art. While not intending to be bound by any theory of action, the filler appears to hinder solvent

- cted from the group consisting of
short chain aliphatic diacid esters, pyrrolidones, butyl carbitol,
di-(lower)alkyl ether/esters or di(lower) alkyl ethers of
di(lower)alkylidene glycols, or a mixture of any of the foregoing;

(b) from about 0.0 to about 30 wt. % of a secondary solvent selected from the group consisting of an **organic** sulfone, an **organic** sulfoxide, a high molecular weight alcohol, a **primary**, secondary or tertiary amine, or a mixture of any of the foregoing;

(c) from about 5.0 to about 50 wt % of an emollient selected from the group consisting of high molecular weight fatty acids, oleic acid, high molecular weight fatty acid amides, and a mixture of any of the foregoing; and

(d) from about 25.0 to about 50.0 wt. % of an amorphous particulate filler selected from the group consisting of **aluminum** silicates, kaolin clay, magnesium silicates, talc, barium sulfates, calcium **carbonate**s, silicas, mica, wollastonite, and

- ive in **removing** the unwanted stain from
different substrates. Furthermore, these active solvents are protected from further dilution or evaporation with an inert filler that entraps the solvent while allowing a gradual leakage of the active solvent for stain removal. Additionally, the filler also supplies abrasive properties to the cleaner to assist in stain removal. The graffiti removers of the invention also contains an emollient that coats the protective filler mentioned above, allowing it to be uniformly rubbed over the unwanted stain without drying or agglomerating.

The graffiti removers of the present invention comprises three and, optionally, four key ingredients, each in effective amounts: (a) an active solvent, (b) an optional secondary solvent; (c) an emillient; and (d) a filler. Preferably, the respective amounts will range from 10.0 to 15.0 wt. % of (a), and, more preferably, from 11.0 to 13.0 wt. % of (a); from

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---------- 5108643
classes:1 510/238 1 510/101 1 510/362 1 510/365 1 510/417 1 510/424 1 510/432 1 510/434
score: 332

keywords: water;aluminum;grease;primary;terpene;emulsion;propylene;nonyl;propionate;organic;removing;greases;glycol;solvent;aqueous;liquid;

- ious **terpene** contents over the
range of 2 to 90% are employed instead of the 2% and 70% contents, such as 15%, 35%, 55%, 75% and 85%, and the same types of results will be obtained.

EXAMPLE 7

This example illustrates other typical dilute o/w microemulsions according to this invention, which are especially suitable for spray-and-wipe types of applications and removals.

	Percent A	Percent B
Sodium C.sub.13-17 paraffin sulfonate	4.0	4.0
C.sub.9-11 alcohol EO 5:1	3.0	4.0
MgO	0.25	0.25
Diethylene glycol monobutyl ether	3.75	--
Ethylene glycol monobutyl ether	--	3.75
**Perfume	1.0	1.0
H.sub.2 SO.sub.4 or NaOH	to pH 6.8	

- based on a **grease** soil removal test.
In such test, white Formica tiles (15 cm..times.15 cm.) are sprayed with a chloroform solution containing 5% cooking fat, 5% hardened tallow and a sufficient amount of an oil soluble dye to render the film visible. After permitting the tiles to dry for about one-quarter of an hour at room temperature (24.degree. C.), the tiles are mounted in a Gardner Washability Machine equipped with two cube-shaped cellulose sponges measuring five cm. on a side. 2.5 Grams of the **liquid** cleaning composition

being tested are pipetted onto the sponge and the number of strokes required to remove the **grease** film is determined. Products are evaluated in pairs and usually six replications are run on each composition. The products are deemed to differ significantly in performance if the mean number of strokes for each product differs by more than five.

The results obtained are set forth in Table A below:

- apacity of the o/w microemulsions of this invention is based on the "dissolving power" of the microemulsion, per se, rather than on the presence or absence of **grease** removal solvent, or on any **grease removing** properties of the co-surfactants, because similar performance results are achieved with other perfumes containing essentially no **terpene**s, as well as with perfumes containing 60% and 70% by weight of **terpene**s, and the presence of co-surfactant does not in itself improve **grease** removal from treated substrates.

EXAMPLE 10

The ability of the inventive compositions to solubilize oleic acid soil is illustrated when the following compositions are compared, using the dissolving power test described in Example 1.

	% by weight			
Component	10A	10B	10C	10D
Sodium C.sub.13-17 paraffin	4.0	4.0		

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classes:1 510/405 1 134/40 1 510/424 1 510/425 1 510/430 1 510/431 1 510/432 1 510/434 1 510/436 1 510/437

score: 326

keywords: water;grease;primary;terpene;carbonate;propylene;hexyl;propionate;organic;esters;propyl;acetate;gum;glycol;solvent;aqueous;liquid;

- A C.sub.9-11 oxo-alcohol with 8 moles of ethylene oxide, marketed by Shell.

Dobanol 45-7
: A C.sub.14-15 oxo-alcohol with 7 moles of ethylene oxide, marketed by Shell.

Pluronic L-42
: A condensation product of ethylene oxide and **propylene** oxide, marketed by BASF-Wyandotte.

Deriphat 170C
: N--C.sub.12-14 alkyl-.beta.-amino propionic acid marketed by General Mills.

Amphoram CP1
: N--cocoyl-.beta.-amino propionic acid marketed by Pierrefitte-Auby.

Deriphat 154
: Disodium-N--tallow-.beta.-amino **propionate** marketed by General Mills.

Ethylan HB-4
: Phenol ethoxylated with 4 moles of ethylene oxide, marketed by Diamond Shamrock.

HT Soap
: Sodium soap prepared from hydrogenated tallow.

CN Soap
: Monoethanolamine soa

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classes:1 510/421 1 510/362 1 510/365 1 510/401 1 510/424 1 510/432 1 510/461

score: 326

keywords: diluted with water;water;aluminum;grease;primary;flash;organic;glycol;solvent;aqueous;liquid;

- hase separation, turbidity or viscosity, sometimes approaching gel consistency, until a small amount of coupling agent has been incorporated in the mixture. In this connection it will by noted that three component

mixtures in peripheral portions of the diagram may be clear and of fluid consistency without addition of coupling agent, but such mixtures are unsatisfactory for various reasons, i.e. insufficient d-limonene to provide a useful cleaning effect, insufficient water to provide the desired elevation in **flash** point or excessive surfactant constituting an economic deterrent.

It should further be noted that the coupling agent, such as Butyl Carbitol (Union Carbide brand of diethylene glycol monobutyl ether) or **hexyl**ene glycol, by itself has no effect on clarifying d-limonene--water mixtures in the concentration employed. In other words it is the co-acting effect of the surfactant and the coupling agent that makes it possibl

- y level.

The manner of using the new cleaning compositions can vary widely according to the soil condition to be cleaned. Application can, for example, be by brush, swab, spray, pressure hosing, dipping, etc. For difficult soils, with heavy deposits of **grease** and other soils, the compositions are best used undiluted; but when the conditions are less severe, the compositions can be **diluted with water** in appropriate amounts up to about one part composition to 100 parts water.

An interesting phenomenon is use of the new compositions, particularly as used undiluted, or with water added to provide about 1 to 10 dilutions, is that greasy soil will remain solubilized while the cleaning mixture is agitated, but will separate as an upper oily layer upon standing, while any suspended particles will settle in a bottom layer.

The intermediate "cleaning solution" layer which separates upon standing shows relatively little loss in its d-lim

- ter

Stabilized d-Limonene	44.8
Potassium salt of dodecyl-benzene sulfonic acid	35.1
Tetrapotassium pyrophosphate	11.4
Butyl Carbitol	2.2
Sodium metasilicate	6.0
	0.5

This is a heavy duty industrial cleaner appropriate for use in environments containing **aluminum** surfaces. It has a **flash** point of about 160.degree.-165.degree. F. (C.O.C.)

EXAMPLE 2

A heavy duty industrial cleaning composition is prepared containing by weight:

	%
Water	32.2
EDTA tetrasodium salt (38%)	4.2
nonylphenol with 9.5 moles of ethylene oxide	5.2
Dodecylbenzene sulfonic acid	9.9
Stabilized d-Limonene	

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classes:1 510/202 1 134/6 1 134/7 1 134/8 1 510/206 1 510/213 1 510/407 1 510/413 1 510/418 1 510/475 1 510/505

score: 302

keywords: water;primary;flash;organic solvent;propylene;organic;removing;paint;glycol;solvent;aqueous;liquid;

- ers thereof, and mixtures thereof. In particular instances, the particulate material is of a particle size no greater than one half inch, although in some instances a particle size of no more than 200 microns is desired and in yet other instances a particle size range of approximately 50-150 microns is preferred for the **organic** material. In yet other instances, it is preferred that the specific

gravity of the material be less than 1.5.
The vehicle may comprise a **liquid** including therein an **organic solvent** and this solvent may be selected from the group consisting essentially of: aliphatic hydrocarbons, aromatic hydrocarbons, lactones, lactams, **terpene**s, alcohols, **organic** acids, amines, amides, ketones, aldehydes, esters, halocarbons, ethers, glycols and combinations thereof. In other instances the **liquid** vehicle may include water whereas in yet other instances the vehicle may be acidic or alkaline. The composition may fur
- ls and the like either taken singly or in combination. Some particular solvents include xylene, **propylene **carbonate**, m-pryol and the like. Inorganic vehicles will generally be aqueous based and can be acidic or alkaline. Either the **organic** or inorganic vehicles can include detergents, surfactants, and other such ancillary ingredients as is well known to those of skill in the art. In some instances it may be advantageous to blend **organic** and aqueous solvents. The basic requirement of a vehicle is that it be inert to the **organic** particulate material.
From the foregoing it should be apparent that there are a wide variety of solvents which may be employed in the present invention. The principal requirements for solvent selection are that the solvent not dissolve the **organic**, polymeric particulate material and that it not damage the system being cleaned. Within these bounds one can readily select a variety of solvent materials.
The

---------- 4533487
classes:1 510/405 1 44/300 1 208/180 1 510/181 1 510/254 1 510/365 1 510/435
score: 292

keywords: water;grease;primary;emulsion;organic;paint;gum;liquid;

- me these problems by introducing a natural, **organic**, non-toxic peel oil derivative. This derivative, entitled d-Limonene, is produced through a particular process for deriving a compound which has the ability to serve as a **primary** cleansing agent with a multitude of uses and is basically harmless to human skin, depending on the various strength of its ingredients. The d'Limonene extract would be obtained from a non-toxic peel oil derivative containing a high citric acid, carbon, and isopropyl compound exhibiting some similarity in **organic** structure to turpentine, dipentine compounds. d-Limonene is derived from lemon, bergamot, caraway, orange, peppermint, spearmint, and other oils. The d-Limonene is introduced into a containment tank and blended with a specific portion of **liquid** detergent containing ionic and anionic surfactants. A mixture of bicarbonate of soda and slaked lime solution, preferably a fifty (50%) percent m
- used as a **primary** cleaning agent for a variety of uses.
It is another object of the present invention to provide a process whereby non-toxic, **organic**, and natural compounds are blended for producing a cleaning agent.
It is a further object of the present invention to provide a process whereby a d-Limonene blended mixture is obtained which has a multitude of uses, including glass cleaner, chrome cleaner, **grease** cutter, etc.
DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT
The process of the present invention is a process whereby a natural, **organic**, non-toxic orange peel oil derivative, hereinafter referred to as d-Limonene, is blended with various substances for producing a general cleaning agent. d-Limonene is basically, in the present state of the art, a high citric acid, carbon, isopropyl compound exhibiting some similarities in **organic** structure to turpentine, dipentine compounds and is derived principally from manufacturing cat

---------- 6019827
classes:1 106/3125 1 106/3158 1 106/3159
score: 290

keywords: water;primary;organic solvent;propylene;hexyl;organic;ink;esters;glycol;solvent;aqueous;liquid;

- ives from the attendant decrease in the water content of the ink.
Miscible **organic solvent**

The second **organic solvent** is miscible with both the discontinuous and the continuous phase. As used herein, the term "second **organic** compound miscible with both the water and the water-insoluble **organic** compound" refers to a compound having a miscibility of at least 10%, both in water and in the water-insoluble **organic** compound. This added solvent, which also functions as a co-solvent, reduces the formation of crusts or beards and enhances the pen reliability. **organic solvent**s suitably employed in the present invention include, but are not limited to, alkanolamines; lactams such as 2-pyrrolidone; glycols; diols such as 1,2- or 1,5-pentanediol; triols; glycol esters; mono- and di- glycol ethers, including ethylene glycol mono butyl ether, diethylene glycol ethers, diethylene glycol mono ethyl, butyl, **hexyl** ethers, **propylene** glycol ether,

---------- 5032265
classes:1 210/1952 1 210/2572 1 210/32169
score: 269

keywords: water;primary;flash;removing;aqueous;liquid;

- n U.S. Pat. No. 3,578,774 to provide sterile urological irrigating **liquid** composition by passing the fluids continuously through a filter designed for **removing** bacteria. However, this device requires an on site source of nonpyrogenic water and urological fluid. It has also been proposed in U.S. Pat. No. 4,253,457 to prepare such irrigation solutions on site by utilizing a combination of a reverse osmosis unit for **removing** pyrogens, a deionization unit for **removing** dissolved solids and pyrogens and a filter for **removing** bacteria in order to produce pyrogen free, bacteria free solution that can be administered directly to the patient. However, this system is limited since the claim of **removing** pyrogens by deionization is limited to removal of some pyrogens, but not all, as required for production of bacteria and pyrogen free water. In addition, the system requires chemical sanitization and cleaning; thereby increasing risk
- to the patient. Neither of the means disclosed in U.S. Pat. Nos. 3,578,774 or 4,253,457 are capable of producing water that meets the USP XXII standards for water for injection or for irrigation for long periods without continuous monitoring, caring and chemical sanitization of the unit by an operator.

British Patent Nos. 1,450,030 and 2,034,584 also disclose means for providing pyrogen free and bacteria free aqueous solution at the site of use of the solutions. However, each of these systems relies upon the use of chemical disinfectant such as with formalin to sanitize the equipment or **flash** sterilization wherein the water used to form the aqueous solution is heated to a temperature, typically 150.degree. C. to 160.degree. C. The use of chemical sanitization is undesirable even though it is an effective means for killing microorganisms because it also introduces harmful chemicals into the system which can be administered acci
- ion, Inc , XXII pages 1456 and 1457 dated Jan. 1, 1990. The specifications include allowable limits on heavy metals and other chemical (organic and inorganic) **contaminant**s, pH and total dissolved solids. The purified water must be sterile and non-pyrogenic.

The chemical impurities in the potable water are removed by the various filtration methods incorporated in the system. The prefilter element removes particulate matter present in the water. The carbon filter element satisfies the dual requirement of **removing** halogens as well as dissolved **organic**s present in the incoming water. The reverse osmosis element removes dissolved ionic impurities, certain **organic**s and is also a barrier for bacteria and pyrogens present in the water. The deionization element removes remaining trace ionic impurities in the purified water from the reverse osmosis module. Finally, the sterile microfilter is a sterile barrier for any remaining bact

---------- 5098591
classes:1 510/106 1 510/206 1 510/467 1 510/505
score: 260

keywords: water;aluminum;adhesive;propylene carbonate;primary;flash;terpene;propylene carbonate;carbonate ;propylene;organic;removing;paint;esters;gum;glycol;solvent;

- Weight Percent

Dipentene	20
Ethanol	15
N-Methylpyrrolidone	25
propylene **carbonate	30
Dodecylbenzene Sulfonic Acid (linear)	8
Water	2

Procedure: Same as general method and Examples 21, 18 and 19.
Results: Showed marginal stripping efficiency, perhaps slightly better than Example 21, because of absence of triethanolamine sulfonate foam. **propylene **carbonate** increased the **flash** point. Removal of triethanolamine resulted in no evidence of foam from triethanolamine sulfonate.
EXAMPLE 23
Impregnated Non-Woven **paint** Strip Applicator Packaged in an **aluminum** Foil Barrier Bag
A non-woven, highly absorbent fabric, without chemical binders, thermally bonded composite blend of cellulose and polypropylene- typically a 50-50 (percent by weight) blend is used. Cloth having a basis wei

---------- 5693516
classes:1 435/188 1 530/402 1 530/422
score: 256

keywords: water;primary;organic solvent;emulsion;propylene;organic;dried;solvent;aqueous;

- d of the present invention, it is required that a reverse micelle system be formed by the protein, an **organic solvent**, water and a surfactant. As used in the present specification and claims, the term "reverse micelles solution" is defined as a water-in-oil microemulsion comprising droplets having a size of between 0.0015-0.2 .mu.m. This is distinguished from a reverse phase **emulsion** (see, for example Friberg, S. E. and Lindman, B., eds. Organized Solutions, Marcel Dekker, NY, 1992). which is a water-in-oil **emulsion** (but not a microemulsion) which has a droplet size of 0.2-100 .mu.m. These two categories are also distinguished by appearance (turbid for a reverse phase **emulsion**, transparent for a reverse micelle solution), and thermodynamic stability (unstable for a reverse phase **emulsion**, stable for a reverse micelle solution). A reverse phase **emulsion** will not provide the same results as a reverse micelle solution, as sh
- ptanol, octanol, 1-nonanol, 2-nonanol, 1-decanol, 2-decanol and the like or a mixture of them. In preparing the reverse micelles, the protein component is preferably in the form of an aqueous solution. More preferably, the protein is provided in the form of a buffered aqueous solution. The solution may be buffered with any standard buffering compound, and in one embodiment, the preferred buffer is a volatile salt. Such volatile salts include ammonium **carbonate**, ammonium bicarbonate, ammonium formate, ammonium acetate, ammonium **propionate**, ammonium sulfite or ammonium nitrite.

A surfactant is required to prepare reverse micelles. Any type of surfactant may be used in the present method, i.e., ionic(anionic or cationic) or nonionic. Examples of anionic surfactants are carboxylates, for example, a metal carboxylate of a long chain fatty acid; N-acylsarcosinates; mono- or diesters of phosphoric acid with fatty alcohol et

---------- 5549840
classes:1 510/365 1 252/29901 1 510/101 1 510/108 1 510/238 1 510/417 1 510/421 1 510/424 1 510/436 1 510/506 1 510/537 1 516/58 1 516/900
score: 254

keywords: water;aluminum;grease;primary;flash;terpene;propylene;propionate;organic;removing;esters;glycol;dried;solvent;aqueous;liquid;irritant;

- Good results also have been obtained with magnesium oxide, magnesium chloride, magnesium acetate, magnesium **propionate** and magnesium hydroxide. These magnesium salts can be used with formulations

at neutral or acidic pH since magnesium hydroxide will not precipitate at these pH levels.

Although magnesium is the preferred multivalent metal from which the salts (inclusive of the oxide and hydroxide) are formed, other polyvalent metal ions also can be used provided that their salts are nontoxic and are soluble in the aqueous phase of the system at the desired pH level. Thus, depending on such factors as the pH of the system, the nature of the **primary** surfactants and cosurfactant, and so on, as well as the availability and cost factors, other suitable polyvalent metal ions include **aluminum**, copper, nickel, iron, calcium, etc. It should be noted, for example, that with the preferred paraffin sulfonate anionic detergent calciu

- the various ingredients can be added sequentially or all at once or in the form of aqueous solutions of each or all of the **primary** detergents and cosurfactants can be separately prepared and combined with each other and with the perfume. The magnesium salt, or other multivalent metal compound, when present, can be added as an aqueous solution thereof or can be added directly. It is not necessary to use elevated temperatures in the formation step and room temperature is sufficient.

The instant microemulsion formulas explicitly exclude alkali metal silicates and alkali meta builders such as alkali metal polyphosphates, alkali metal **carbonate**s, alkali metal phosphonates and alkali metal citrates because these materials, if used in the instant composition, would cause the composition to have a high pH as well as leaving residue on the surface being cleaned.

The present invention also relates to an aqueous solution of a **grease**

---------- 5064557
classes:1 510/188 1 134/38 1 134/39 1 134/40 1 510/225 1 510/407 1 510/505
score: 254

keywords: water;primary;flash;propylene;removing;glycol;solvent;

- e, dimethyl glutarate and dimethyl succinate; tetrahydrofurfuryl alcohol, **propylene** glycol ethers, **propylene **carbonate**, dimethyl imidazolidinone, tetramethyl urea, **terpene**s, and mixtures thereof, and about 0.01-0.03% by weight of the composition of said inhibitor.

11. A composition according to claim 10 which includes about 0.2-1.0% by weight of a surfactant.

12. A composition according to claim 11 which includes about 0.05-0.15% by weight of an odor masking agent.

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a resin cleaner composition for use in the fiberglass fabrication industry, and more particularly, to a solvent composition which achieves an increased resin loading in the solvent without increasing its rate of polymerization.

2. Description of the Prior Art

Traditionally, companies which use fiberglass in the manufacture of boats, automobile parts, tanks, panels and the like have used a

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---------- 5075026
classes:1 510/101 1 510/104 1 510/106 1 510/365 1 510/417
score: 246

keywords: water;aluminum;grease;primary;terpene;emulsion;propylene;nonyl;propionate;organic;removing;esters;glycol;solvent;aqueous;liquid;

- rm.

However, at the same time it should be understood that depending on the levels of surfactants, cosurfactants, perfume and other ingredients, some degree of dilution without disrupting the microemulsion, per se, is possible. For example, at the preferred low levels of active surfactant compounds (i.e., **primary** anionic and nonionic detergents) dilutions up to about 50% will generally be well tolerated without causing phase separation, that is, the microemulsion state will be maintained.

However, even when diluted to a great extent, such as a 2- to 10-fold or

more dilution, for example, the resulting compositions are still effective in cleaning greasy, oily and other types of soil. Furthermore, the presence of magnesium ions or other polyvalent ions, e.g., **aluminum**, as will be described in greater detail below further serves to boost cleaning performance of the **primary** detergents in dilute usage.

On the other hand, it is also

- rve to improve overall product performance.

One such ingredient is an inorganic or **organic** salt or oxide of a multivalent metal cation, particularly Mg++. The metal or oxide provides several benefits including improved cleaning performance in dilute usage, particularly in soft water areas, and minimized amounts of perfume required to obtain the microemulsion state. Magnesium sulfate, either anhydrous or hydrated (e.g., heptahydrate), is especially preferred as the magnesium salt. Good results also have been obtained with magnesium oxide, magnesium chloride, magnesium acetate, magnesium **propionate** and magnesium hydroxide. These magnesium salts can be used with formulations at neutral or acidic pH since magnesium hydroxide will not precipitate at these pH levels.

Although magnesium is the preferred multivalent metal from which the salts (inclusive of the oxide and hydroxide) are formed, other polyvalent metal ions also can be us

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---------- 5035826
classes:1 134/36 1 510/100 1 510/235 1 510/291 1 510/340 1 510/365
score: 244

keywords: diluted with water;water;tar;primary;organic solvent;emulsion;propylene;nonyl;organic;removing; esters;glycol;dried;solvent;aqueous;liquid;

- rcentages of soil removals are calculated. It is found that the invented **liquid** crystal detergent composition, without builder salt and with less detergent content than the paste pre-spotting agent, is equivalent to it or better in **removing** all stains except blood, in which the commercial pre-spotter is significantly better, but the invented compositions are better than the commercial agent in **removing** fruit stains (cherries).

In addition to the laboratory experiments, practical use test comparisons with commercial **liquid** detergents and pre-spotting agents are undertaken by applying the same weights of experimental and the comparative products to dirty **paint**ed wall surfaces, from which the products are lightly sponged after one minute and after three minutes. In such cases the invented **liquid** crystal detergent compositions adhere better to the wall than do the other products, when the same weights of all are sprayed onto

- 29.6

Dobanol 91/2.5	7.4
Sodium dioctyl sulfosuccinate	2.0
Tripropylene glycol n-butyl ether	21.0
C.sub.10-11 isoparaffin	15.0
Water, deionized	25.0
	100.0

The above described **liquid** crystal detergent composition is a clear water-in-oil microemulsion detergent that is made by mixing the components thereof in the same manner as described in Example 1. Such microemulsion, like the other microemulsions resulting from employments of the invented **liquid** crystal compositions, is dilutable with room temperature water (and even cold water). In tests like those reported in Example 1 it also performs exceptionally well, being an acceptable laundry pre-spotter and being far superior to **liquid** dishwashing detergent compositions and other **liquid** detergent compositions commercially em

- pecification, and essentially the same desirable pre-spotting and cleaning results are obtainable. Similarly, there may be substituted for the indicated nonionic detergents, anionic surfactant, cosurfactant and lipophile, other such compounds, as set forth in the specification, such as Neodol.RTM. 25-3, potassium dihexyl sulfosuccinate, triethylene glycol isobutyl ether and n-decane and/or methyl cocate. Mixtures of the various individual components may also be employed in some cases to produce optimum results.

Although usually builder salts will be omitted from the present formulations, so as to make the products useful for pre-spotting and washing of dishes, as Well as laundry and wall and floor surfaces, for those products not intended for hand dishwashing applications such builder salts may be present, such as sodium tripolyphosphate and sodium **carbonate**, so long as they do not interfere with the desirable **liquid**

---------- 5076954
classes:1 134/40 1 510/109 1 510/238 1 510/365 1 510/417 1 510/422 1 510/424
score: 240

keywords: diluted with water;water;aluminum;grease;primary;terpene;emulsion;propylene;nonyl;propionate;organic;removing;glycol;solvent;aqueous;liquid;

- **terpene**s, and balance of esters, aldehydes and ethers
The described formulas are excellent clear, stable microemulsion all-purpose cleaners and remove fatty soil (lard) from hard-surfaces, applied as a spray and wiped off without rinsing, used as is, or diluted with an equal weight of water.
EXAMPLE 8
A composition of the formula of Example 7A is made again, with the exception that the formalin and antioxidant ingredients are omitted. The cleaning properties of this composition are compared with an identical composition in which the 1% of perfume is replaced by 1% of water.
The cleaning performance comparison is based on a **grease** soil removal test. In such test, white Formica tiles (15 cm..times.15 cm.) are sprayed with a chloroform solution containing 5% cooking fat, 5% hardened tallow and a sufficient amount of an oil soluble dye to render the film visible. After permitting the tiles to dry for about one-quarter of an hour at roo
- parison is made between the composition of Example 7-A and an identical composition except that the diethylene glycol monobutyl ether (DEGMBE) co-surfactant is replaced by an equivalent weight of 1:1:1 mixture of succinic acid:glutaric acid:adipic acid, the following results are obtained.

Formulation	Mean Number of Strokes
Ex. 7-A	25
Ex. 7-A, with acids mixture in place of DEGMBE	25

The comparatives presented demonstrate that the **grease** removal capacity of the o/w microemulsions of this invention is based on the "dissolving power" of the microemulsion, per se, rather than on the presence or absence of **grease** removal solvent, or on any **grease removing** properties of the co-surfactants, because similar performance results are achieved with other perfumes containing ess

---------- 6030935
classes:1 510/417 1 510/423 1 510/424 1 510/425 1 510/428 1 510/432 1 510/433 1 510/470 1 510/503
score: 232

keywords: water;aluminum;grease;primary;emulsion;propylene;decyl;hexyl;organic;removing;esters;glycol;solvent;aqueous;liquid;

- lene glycol monoethyl ether, mono, di, tributylene glycol monopropyl ether, mono, di, tributylene glycol monobutyl ether, mono, di, tributylene glycol monopentyl ether, mono, di, tributylene glycol monohexyl ether, ethylene glycol monoacetate and dipropylene glycol **propionate**.
While all of the aforementioned glycol ether compounds provide the described stability, the most preferred cosurfactant compounds of each type, on the basis of cost and cosmetic appearance (particularly odor), are dipropylene glycol monomethyl ether and diethylene glycol monobutyl ether. Other suitable water soluble cosurfactants are water soluble esters such as ethyl lactate and water soluble carbohydrates such as butyl glycosides.
The amount of cosurfactant required to stabilize the microemulsion

compositions will, of course, depend on such factors as the surface tension characteristics of the cosurfactant, the type and amounts of the **primary** surf

- itional ingredients as described below.

In addition to the above-described essential ingredients required for the formation of the **liquid** crystal composition or the microemulsion composition, the compositions of this invention may often and preferably do contain one or more additional ingredients which serve to improve overall product performance.

One such ingredient is an inorganic or **organic** salt of oxide of a multivalent metal cation, particularly Mg.sup.++ . The metal salt or oxide provides several benefits including improved cleaning performance in dilute usage, particularly in soft water areas, and minimized amounts of perfume required to obtain the microemulsion state. Magnesium sulfate, either anhydrous or hydrated (e.g., heptahydrate), is especially preferred as the magnesium salt. Good results also have been obtained with magnesium oxide, magnesium chloride, magnesium acetate, magnesium **propionate** magnesium hydr

- level, for example 1 weight percent, of citric acid is added to the composition which is designed to have a neutral pH. Alternatively, the **aluminum** salt can be directly added as the citrate in such case. As the salt, the same general classes of anions, as mentioned for the magnesium salts can be used, such as halide (e.g., bromide, chloride), sulfate, nitrate, hydroxide, oxide, acetate, **propionate**, etc.

The proportion of the multivalent salt generally will be from 0 to about 6 wt. %, more preferably about 1 to about 5 wt. %.

The ability to formulate mild, acid or neutral products without builders which have **grease** removal capacities is a feature of the present invention because the prior art o/w microemulsion formulations most usually are highly alkaline or highly built or both.

The instant compositions contain 0.0005 wt. % to 0.4 wt. %, more preferably 0.0008 wt. % to 0.2 wt. % of a dye such as Orange 4, FD&C Green 8, Green

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---------- 5082584

classes:1 510/101 1 510/365 1 510/417

score: 220

keywords: water;aluminum;grease;primary;terpene;emulsion;propylene;nonyl;propionate;organic;removing;esters;glycol;solvent;aqueous;liquid;

- in the inventive microemulsion compositions is water. The proportion of water in the dilute o/w microemulsion compositions generally is in the range of 62% to 96.6%, preferably 79% to 92.4% by weight of the usual diluted o/w microemulsion composition.

As believed to have been made clear from the foregoing description, the dilute o/w microemulsion **liquid** all-purpose cleaning compositions of this invention are especially effective when used as is, that is, without further dilution in water, since the properties of the composition as an o/w microemulsion are best manifested in the neat (undiluted) form. However, at the same time it should be understood that depending on the levels of surfactants, cosurfactants, perfume and other ingredients, some degree of dilution without disrupting the microemulsion, per se, is possible. For example, at the preferred low levels of active surfactant compounds (i.e., **primary** anionic and nonionic

- n composition, the compositions of this invention may often and preferably do contain one ore more additional ingredients which serve to improve overall product performance.

One such ingredient is an inorganic or **organic** salt or oxide of a multivalent metal cation, particularly Mg++. The metal salt or oxide provides several benefits including improved cleaning performance in dilute usage, particularly in soft water areas, and minimized amounts of perfume required to obtain the microemulsion state. Magnesium sulfate, either anhydrous or hydrated (e.g., heptahydrate), is especially preferred as the magnesium salt. Good results also have been obtained with magnesium oxide, magnesium chloride, magnesium acetate, magnesium **propionate** and magnesium hydroxide. These magnesium salts can be used with formulations at neutral or acidic pH since magnesium hydroxide will not precipitate at these pH levels.

Although magnesium is the preferr

---------- 5490948
classes:1 510/283 1 510/284 1 510/320 1 510/336 1 510/351 1 516/66 1 516/75 1 516/109 1 516/902
score: 220

keywords: water;grease;primary;organic solvent;propylene;decyl;nonyl;octyl;hexyl;organic;removing;esters;
propyl;glycol;solvent;aqueous;liquid;

- rcent by weight and less than about 25 percent by weight based on the
total weight of the composition.
In the single phase continuous microemulsions, an **organic solvent** or a
mixture of two or more **organic solvent**s is employed, wherein the **organic**
solvent or mixture of **organic solvent**s is characterized as containing no
more than about 2 weight percent water at 25.degree. C. when the **organic**
solvent is saturated with water in the absence of surfactants or other
additives. Preferably, the **organic solvent** or mixture of **organic solvent**s
contain no more than about 1 weight percent water at 25.degree. C. when
saturated, more preferably no more than about 0.5 weight percent water.
This can be readily determined by water titration, for example, wherein
water is added to the one or more **organic solvent**s until cloudiness of
solution is observed or an excess water phase develops.
The **organic solvent** or the mixture of two or more **organic** solven
- ic esters include methyl laurate,
methyl oleate, **hexyl acetate**s, pentyl acetates, **octyl acetate**s, **nonyl**
acetates, and **decyl acetate**s.
The aliphatic hydrocarbons can be linear, branched, cyclic or can
combinations thereof. Preferred aliphatic hydrocarbons contain 3 to 40
carbon atoms, preferably 6 to 24 carbon atoms. Representative examples of
more preferred aliphatic hydrocarbons include alkanes such as **liquid**
propane, butane, hexane, octane, decane, dodecane, hexadecane, mineral
oils, paraffin oils, decahydronaphthalene, bicyclohexane, cyclohexane,
olefins such as 1-decene, 1-dodecene, octadecene, and hexadecene, and
terpenes such as limonene and pinene. Example of commercially available
mineral oil is Witco #40 which is a white mineral oil commercially
available from Witco Corporation. Examples of commercially available
aliphatic hydrocarbons are Norpar 12, 13, and 15 (normal paraffin solvents
available from Exxon), Isop

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classes:1 427/387 1 428/447 1 524/730 1 524/837 1 524/861 1 524/862 1 525/479 1 528/15 1 528/31 1 528/32
score: 219

keywords: water;aluminum;primary;aqueous emulsion;emulsion;organic;glycol;dried;aqueous;

- able radicals and vinyl, acryloyloxy,
methacryloyloxy, epoxy or acid anhydride groups bonded to silicon via
carbon. It is also possible to use partial hydrolysates and/or mixed
hydrolysates of such silanes. Preference is given to using a reaction
product of vinyltriacetoxysilane and the silane of the formula
##STR1##
It is possible to use one type of adhesion promoter, or else mixtures of
two or more silanes or their reaction products or partial or mixed
hydrolysates. The adhesion promoter is preferably used in amounts of 1 to
20% by weight, preferably in amounts of 1 to 10% by weight, more
preferably in amounts of 2 to 8% by weight.
The products of the invention may optionally include **aqueous **emulsion**s of
silicone resins (5), preferably of the general formula (R.sub.3
SiO.sub.1/2).sub.a (RSiO.sub.3/2).sub.b, or MT resins and/or MQ resins of
the general formula (R.sub.3 SiO.sub.1/2).sub.a (SiO.sub.4/2).sub.b, where
R is a
- xide, interpolymers of ethylene oxide and **propylene**
oxide, stearates, and the like. These are used in amounts of 3% to 20%
based on the total silicone content.
The carbon black is preferably gas black, furnace black or lampblack. It is
also preferable to use aqueous carbon black dispersions commercially
obtainable from Degussa under the names of DERUSSOL, SCHWARZDISPERSION or
RUSSDISPERSION. The carbon black dispersions preferably have a solids
content of 1 to 50% by weight. The **primary** particle size of the carbon
blacks used may be between 10 and 100 nm. The dispersions may be
stabilized anionically, nonionically or anionically/nonionically. The

carbon black content based on silicone solids content is preferably between 1 and 50%, more preferably between 3 and 40% by weight, most preferably between 5 and 20% by weight.

In addition to the aforementioned ingredients, the **emulsion**s of this invention may also include further ingr

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classes:1 8/142 1 8/137 1 8/139 1 134/2 1 134/40 1 134/42 1 510/175 1 510/176 1 510/177 1 510/245 1 510/285 1 510/291 1 510/292 1 510/408 1 510/411 1 510/415

score: 215

keywords: water;primary;propylene;ink;acetate;glycol;dried;solvent;

- emplary surfactants are fatty alcohol polyethylene glycol ethers and linear **primary** alcohol eynoxylates. While fabric softeners are not necessary to achieve effective dry-cleaning, they are beneficial and serve to enhance the dry-cleaning process.

The following examples are set forth to illustrate more clearly the principle and practice of the present invention. It is to be understood, of course, that the invention is not limited to the specific examples.

EXAMPLE 1

One of the most significant properties that a dry-cleaning solvent should possess is limited fiber shrinkage to ensure that fibers comprising the garment do not shrink excessively. Excessive shrinkage, naturally, deforms the garment rendering it unsuitable for future wear. Accordingly, the dry-cleaning solvent which is employed must not excessively shrink the component fibers which comprise the fabric of the garment. In contemporary usage, garments containing virgin wool

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EXAMPLE 2

The shrinkage test conducted in Example 1, was repeated with 4".times.4" swatches of acetate fabric. The results are set forth below in Table II.

TABLE II

Solvent	% Shrinkage on 1st Immersion
PM (propylene glycol methyl ether)	3%
PNP (propylene glycol n-propyl ether)	3%
DPM (dipropylene glycol methyl ether)	2-5%
PERC (Perchloroethylene)	2%
PTB (propylene glycol tertiary-butyl ether)	1/2%

It is evident from an examination of the results tabulated in Tables I and II that **propylene** glycol tertiary-butyl ether azeotropic mixture resulted in the smallest percentage of shrinkage in both virgin wool and acetate fabrics

- ems which must be met, addressed and solved before a new dry-cleaning solvent can be introduced successfully.

Dye-bleeding tests were conducted by taking test swatches of virgin wool, 1".times.1", and immersing them in separate containers filled with each of the azeotropic solvent mixtures indicated in Table III below. Ball bearings were added to each of the containers to increase the impact of mechanical action on the dyes in an effort to dislodge the dyes from the fabric. The increased mechanical action was applied for a period of 10 minutes. Thereafter, the test swatch and the ball bearings were removed from the solvent. Colorimeter tests employing a Bausch Lomb Spec-20 colorimeter were conducted on the solvent remaining, which serves to indicate the relative quantity of dye removed by the test swatch. The results are set forth below in Table III with respect to the various solvents tested on virgin wool swatches which had

- ects dye bleeding, whether the fabric employed is virgin wool or acetate. In point of fact, the solvent of the present invention was in each instance, regardless of fabric type or dye color, significantly more effective in preventing the bleeding of dyes when compared with the non-Perc solvents.

EXAMPLE 5

A stain removal test was conducted with respect to cotton by taking a series of 12".times.12" test panels of cotton and applying thereto standard stain items as set forth below in Table V, which were then cleaned with a Perc azeotropic mixture containing soap. Another set of test panels similarly stained were cleaned with the PTB azeotropic mixture of the present invention without soap. It will be understood by those skilled in the art that the purpose of the solvent is to act as a **carrier** for detergents, soaps, water, etc. and that most stains are removed by "spotting" prior to the dry-cleaning process.

TA

---------- 6261541
classes:1 424/59 1 424/60 1 424/400 1 424/401
score: 213

keywords: water;tar;primary;emulsion;propylene;decyl;octyl;hexyl;organic;esters;acetate;glycol;dried;aqueous;liquid;

- uct and during use by consumers who may inadvertently contaminate the products during normal use. Typical preservatives include the lower alkyl esters of para-hydroxybenzoates (parabens) especially, methylparaben, propylparaben, isobutylparaben and mixtures thereof, benzyl alcohol and benzoic acid. A commercially available preservative is Germaben.RTM.II, composed of a mixture of diazolidinyl urea (30%), methylparaben (11%), propylparaben (3%) and **propylene** glycol (56%), trademark of Sutton Laboratories, Charlotte, N.C. One or more antimicrobial preservatives can optionally be included in the **emulsion** in an amount ranging from about 0.001 to about 10 weight percent, preferably about 0.05 to about 2 percent.

Thickening Agents

The viscosity of the **emulsion** may be maintained at a selected level using an acceptable thickening agent, such as methyl cellulose, xanthan gum carboxymethyl cellulose, hydroxpropyl cellulose, carbomer, ca

---------- 6475632
classes:1 428/500 1 428/507 1 428/505 1 525/3285 1 524/457 1 524/460
score: 207

keywords: water;primary;emulsion;organic;paint;esters;glycol;aqueous;

- bw of methyl methacrylate,
528.0 pbw of butyl acrylate, and
2.75 pbw of ammonium peroxodisulfate

by stirring with a high-speed stirrer, and continuing stirring until a stable **emulsion** is formed. Then, in an appropriate reaction vessel,

522.5 pbw of water,
12.0 pbw of Ambergum 3021 .RTM.,
4.0 pbw of a 38% strength solution of a C.sub.11 alkyl polyglycol ether sulfate containing approximately 7 ethylene oxide units, and
66.0 pbw of the monomer **emulsion**

are heated to 80.degree. C. and admixed with a solution of 0.55 pbw of ammonium peroxodisulfate in 15 pbw of water. Subsequently, the remaining monomer **emulsion** is metered in over the course of 3.5 hours. Heating is continued for 60 minutes, and then the mixture is cooled. The pH is adjusted to 9.0 using a 12.5% strength ammonia solution. The solids content of the dispersion is 49.5% by weight and the MFT is

- ately 3 ethylene oxide units,
and

66.0 pbw of the monomer **emulsion**

are heated to 80.degree. C. and admixed with a solution of 0.55 pbw of ammonium peroxodisulfate in 15 pbw of water. Subsequently, the remaining monomer **emulsion** is metered in over the course of 3.5 hours. Heating is continued for 60 minutes, and then the mixture is cooled. The pH is adjusted to 9.0 using a 12.5% strength ammonia solution. The solids content of the dispersion is 49.9% by weight and the MFT is 10.degree. C.

EXAMPLE 4

First of all, a monomer **emulsion** is prepared. This is done by adjusting a mixture of

520.3 pbw of water,
5.5 pbw of Blanose 7 ULC .RTM.,
39.3 pbw of a 38% strength solution of a C.sub.12 to C.sub.14 alkyl polyglycol
ether sulfate containing approximately 3 ethylene oxide units, and
11.0 pbw of methacrylic acid
to a pH of 8 using a 12.5% strength ammonia solution, incorporating

- the dispersion is 49.9% by weight and the MFT is 13.degree. C.

Comparative Example 5

First of all, a monomer **emulsion** is prepared. This is done by preparing a mixture of

512.7 pbw of water,
39.3 pbw of a 35% strength solution of a C.sub.12 to C.sub.14 alkyl polyglycol
ether sulfate containing approximately 3 ethylene oxide units, and
11.0 pbw of methacrylic acid,
incorporating
572.0 pbw of methyl methacrylate,
528.0 pbw of butyl acrylate, and
2.75 pbw of ammonium peroxodisulfate
by stirring with a high-speed stirrer, and continuing stirring until a stable **emulsion** is formed. Then, in an appropriate reaction vessel,

522.5 pbw of water,
4.0 pbw of a 38% strength solution of a C.sub.12 to C.sub.14 alkyl polyglycol
ether sulfate containing approximately 3 ethylene oxide units, and
66.0 pbw of the monomer **emulsion**
are heated to 80.degree. C. a
- il a
stable **emulsion** is formed. Then, in an appropriate reaction vessel,

522.5 pbw of water,
19.7 pbw of a 38% strength solution of a C.sub.12 to C.sub.14 alkyl polyglycol
ether sulfate containing approximately 3 ethylene oxide units, and
66.0 pbw of the monomer **emulsion**
are heated to 80.degree. C. and admixed with a solution of 0.55 pbw of ammonium peroxodisulfate in 15 pbw of water. Subsequently, the remaining monomer **emulsion** is metered in over the course of 3.5 hours. Heating is continued for 60 minutes, and then the mixture is cooled. The pH is adjusted to 9.0 using a 12.5% strength ammonia solution. The solids content of the dispersion is 50.4% by weight and the MFT is 10.degree. C.

EXAMPLE 7

In order to examine the compatibility with respect to cement, 10% by weight of cement, based on the dispersion, is incorporated by stirring into each of the dispersions of Examples 1 to 4 and of Comp
- of butyl diglycol, and
1.0 pbw of silicone defoamer
is added to 87.5 pbw of each paste, **paint** preparation being preceded by the stirred incorporation, into the dispersion of Example 1, of an additional 0.6 pbw of a neutralized polyacrylic acid (Lopon 890.RTM.) as dispersant. The cement compatibility and water absorption of the **paint**s are determined, as is the spotting on fiber cement slabs on exposure to moisture under hot conditions, in order to simulate the efflorescence behavior.

paint based on dispersion of Example:	Cement compatibility of the **paint** with addition of 10% cement .sup.1)	Water absorption of the **paint** in % .sup.2)	Spotting .sup.3)
1 with addition of 0.6 pbw of Lopon 890 .RTM.	stable	7	minimal
2	stable	12	none
3	stable	6	minimal

---------- 4640719
classes:1 134/40 1 134/42
score: 204

keywords: water;adhesive;primary;terpene;organic;removing;dried;solvent;

- :
134/40; 134/42
Intern'l Class:
C23G 001/00
Field of Search:

134/40,42,26

References Cited [Referenced By]
U.S. Patent Documents
4246147Jan., 1981Bakos et al.260/18.
4276186Jun., 1981Bakos et al.252/158.
4294729Oct., 1981Bakos et al.252/545.
4369287Jan., 1983Hutchinson et al.524/700.
4373974Feb., 1983Barajas148/24.
4434084Feb., 1984Hicks et al.252/512.
4511488Apr., 1985Matta252/162.
primary Examiner:Corbin; Arthur L.
Attorney, Agent or Firm:Pennie & Edmonds
Claims
What is claimed is:
1. A method for **removing** rosin soldering flux or **adhesive** tape residues from a printed wiring board, comprising
(a) contacting the board with a composition comprising a **terpene** compound and from 0 to about 40% by weight of a **terpene** emulsifying surfactant;
(b) allowing the contact to continue for sufficient time to solubilize the soldering flux or tape residues; and
(c) **removing** the composition and solubilized soldering flux or tape residues from
- oup consisting of the d-form of limonene, the e-form of limonene and dipentene.
4. The method of claim 2 wherein the contact is carried out at a temperature of from about room temperature to about 150.degree. F.
5. The method of claim 1 wherein the **terpene** compound is selected from the group consisting of the d-form of limonene, the e-form of limonene and dipentene.
6. The method of claim 5 wherein the **terpene** compound is the d-form or the e-form of limonene.
7. The method of claim 6 wherein the surfactant comprises by weight of the composition about 6.5% poly (7) ethoxy **nonyl**phenol, 2.1% poly (10) ethoxy **nonyl**phenol and 1.4% sodium dioctyl sulfosuccinate.
8. The method of claim 5 wherein the **terpene** compound is dipentene.
9. The method of claim 1 wherein the contact is carried out at a temperature of from about room temperature to about 150.degree. F.
Description
TABLE OF CONTENTS

- urfactants or alcohol derivatives may be added to these alkaline cleaning compounds to facilitate the removal of such rosin soap. Unfortunately, these compounds like the water soluble soldering fluxes have a tendency to cause corrosion on the surfaces and interfaces of printed wiring boards if they are not completely and rapidly removed during the fabrication process.
In another approach, Bakos et al. [U.S. Pat. No. 4,276,186] have used mixtures of N-methyl-2-pyrrolidone and a water miscible alkanolamine to remove solder flux and solder flux residue from integrated circuit modules. These mixtures were also said to be useful for **removing** various cured synthetic **organic** polymer compositions such as cured polyimide coating compositions from integrated circuit chip modules.
During the manufacture of printed wiring boards, it is sometimes necessary to temporarily protect certain portions of the board from processing steps such as t

---------- 3382181
classes:none
score: 200

keywords:

---------- 6475556
classes:1 427/137 1 427/136 1 427/4071
score: 176

keywords: water;primary;organic solvent;aqueous emulsion;emulsion;propylene;organic;paint;sap;latex;ester
s;acetate;dried;solvent;aqueous;liquid;

- ed to as "spraying" or "application" herein.
One method of application of the absorber to the road marking **paint**, disclosed in U.S. Pat. No. 5,947,632, is to spray the **paint**, followed by any glass beads, and then finally to spray the absorber. Alternatively, the absorber may be applied before or together with application of the glass beads, or even incorporated into the fan of **paint** as it is sprayed. The present invention provides improvement upon the methods of U.S. Pat. No. 5,947,632. The methods of the present invention include applying the absorber prior to application of at least one of binder components B and C. In cases where the absorber is applied either in the same step with a binder component, or in a previous step to the final step that includes a binder component, the absorber is less likely to bounce off the surface of the **paint**. Furthermore, the absorber is more likely to be covered by a layer of **paint**. Such cov
- be
kept separate and applied separately.
Absorber may, in addition, be applied after the application of the **paint** has been completed. Exercise of this option may be particularly useful for road-marking **paint**. This use can be by design, or as a remedial step. The term "remedial step" means that if a road-marking crew has applied by the usual means a waterborne road-marking **paint** and they find that it is not drying quickly enough, they can accelerate drying by applying the absorber particles in accordance with the invention. One such situation is in the case of a waterborne road-marking operation which commences under favorable climatic conditions (e.g. 20.degree. C. and 50% relative humidity), but is being finished under unfavorable conditions such as a lower temperature of 10.degree. C. and a higher relative humidity of 85%. The more recently applied waterborne road markings will dry more slowly than expected and this wil
- tified hygrometer and temperature indicator, both of which were fastened to the center of the rear wall of the test chamber to ensure balanced measurement. The 90%.+-.3% relative humidity was obtained by filling the pan at the bottom of the completely closed test chamber with a 1 inch layer of water, equilibrating the chamber overnight (about 16 hours) before testing (bringing the relative humidity inside the chamber to 100%), and then adjusting the size of the side port openings to achieve a relative humidity of 90%.+-.3% within the chamber. The temperature inside the test chamber was 23.degree. C. (74.degree. F.).
The door of the test chamber was opened briefly at 5-minute intervals to evaluate the dry through time for the **paint** test panel on each of the three test areas (absorber, glass, and untreated). Dry through time is defined as the time it takes for a wet **paint** film to reach a state such that the **paint** cannot be disto
- rted with a 90.degree. thumb twist when the thumb is touching the **paint** surface, but no pressure is being applied. During the early stages of drying, dry through is assessed by pushing a small applicator stick through the surface of the film to the substrate, and then gauging the dryness of the coating in the lower layer by dragging the applicator stick along the substrate for a length of approximately 0.5 inch (.about.1.27 cm). As it becomes clear that the coating is approaching a dried through state, the panel is then removed from the box at the appropriate time, and the aforementioned 90.degree. thumb twist test is conducted.
The compositions of various test **paint**s are as shown in Table II. All numbers in columns A, B, and C are in grams. **paint**s A, B, and C are typically referred to as "fast drying" or "quick setting" **paint**s.

TABLE II

	paint	**paint**	**paint**

For
- astman Chemicals, Kingsport, Tennessee; NATROSOL .RTM. (a registered trademark) was obtained from Hercules Incorporated.

The results are shown below in Table III.

TABLE III

Empl. No.	Absorber or Auxiliary Material	**paint** Formulation (from Table II)	Dry-through Time (min.)	Draw-down gap
1	None	C	80	20 mils
2	P35 (glass)	C	90	20 mils
3	AC07 (glass)	C	90	20 mils
4	AMBERLITE .RTM. 1200H	C	20	20 mils
5	AMBERJET .RTM. 120H	C	20	20 mils
6	AMBERLITE .RTM. XE-64	C	25	20 mils
7	AMBERLITE .RTM. IRC-84SP	C	25	20 mils
8	AMBERLITE .RTM. A-15	C	30	20 mils
9	AQUALIC .RTM. CA	C		

6360511

classes:1 52/74611 1 52/408 1 52/7414

score: 176

keywords: water;aluminum;tar;adhesive;primary;aqueous emulsion;emulsion;carbonate;organic;removing;paint;latex;dried;solvent;aqueous;liquid;

- g a bitumen-based built-up roofing membrane. Such method involves the steps of:

(A) **removing** loose mineral aggregate or mineral surfacing, if any, from the upper surface of an existing roofing membrane,

(B) cleaning the upper surface of the existing roofing membrane,

(C) applying one or more layers of reinforcement, the bottom layer being attached to the cleaned upper surface of the existing roofing membrane,

(D) applying a bitumen-based waterproofing **adhesive** between each layer of reinforcement when more than one layer is applied, and between the bottom layer of reinforcement and the cleaned upper surface of the existing roofing membrane, wherein each reinforcement layer is adhered to the bitumen-based **adhesive** applied between the layers, and the bottom layer of reinforcement is adhered to the cleaned surface of the existing membrane,

(E) applying a bitumen-based flood coat over the reinforcement layer or layers, and

(F) embedding a pr

- to about 20% by weight, based on the total weight of the composition, of an acrylonitrile-butadiene copolymer, to provide a reinforcement containing at least about 100% by weight of the coal tar composition based on the weight of the unimpregnated reinforcement.

A wide variety of reinforcement materials as described above can be utilized in the reinforcement sheets which are impregnated with the coal tar compositions, and these include webs and felts prepared with material selected from the group consisting of **organic** felts, glass fiber felts, polyesters, and combinations thereof. The reinforcement sheets which have been impregnated with the coal tar compositions are useful with and compatible with asphalt **adhesive**s and asphalt impregnated reinforcement sheets. The amount of coal tar composition present in the coal tar impregnated reinforcement sheets may vary from about 10 lbs/square to about 30 or 40 lbs/square. In one prefe

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2935479

classes:none

score: 150

keywords: